

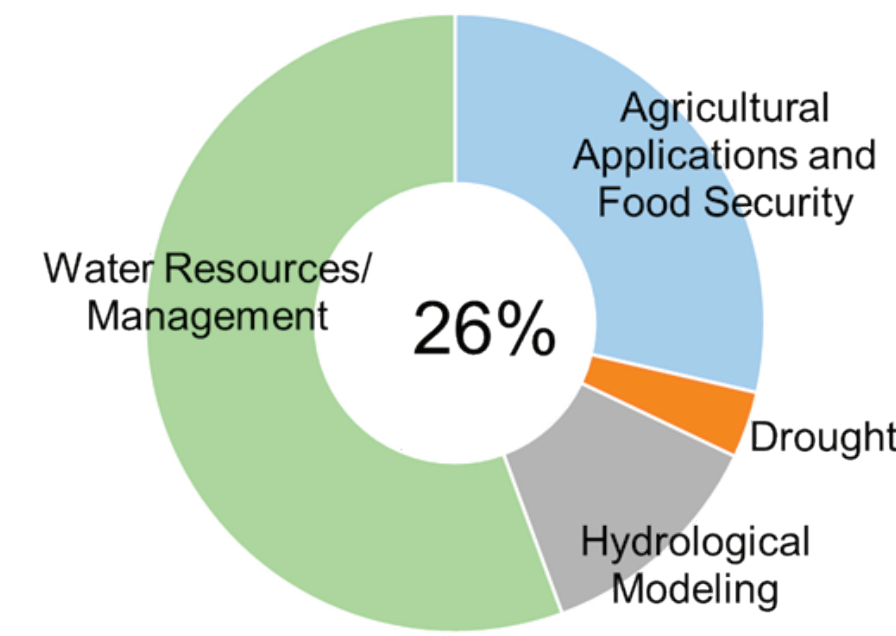


Water Resources, Agricultural Forecasting & Food Security

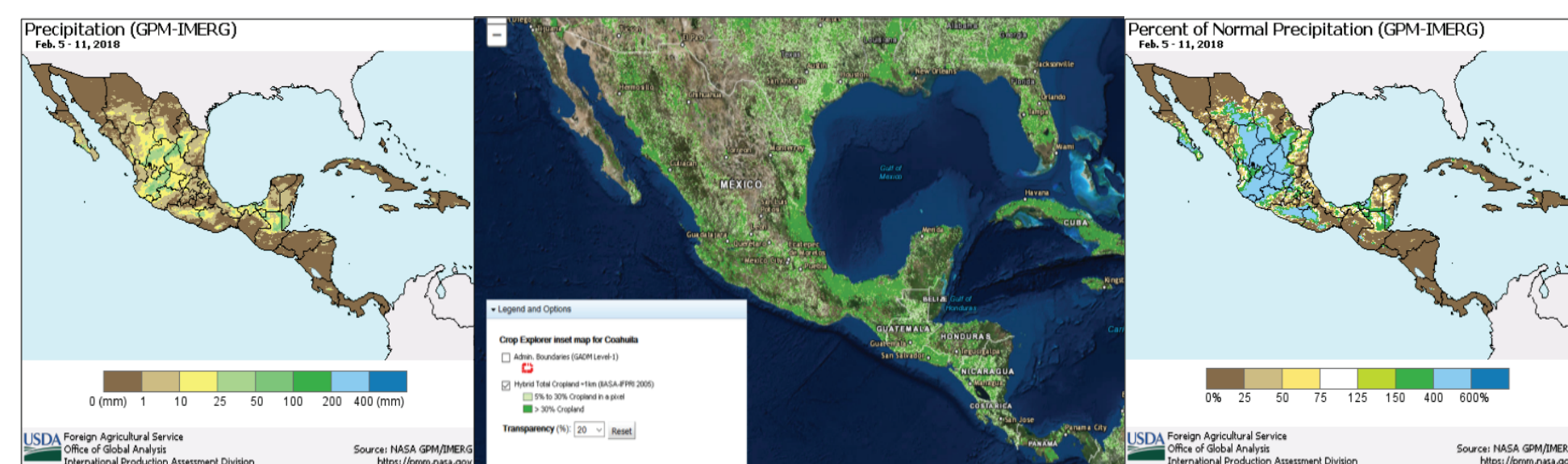
Analyze and forecast the amount, distribution, timing and onset of seasonal rain and snow to prepare for freshwater shortages and forecast crop yields.

Example Users:

- USDA FAS
- Agvesto
- World Food Programme
- USAID



Case Study: USDA Uses GPM



GPM IMERG data is used routinely within the USDA Foreign Agricultural Service's global crop production analysis to determine impacts on agricultural yields and vegetation health affecting food security.

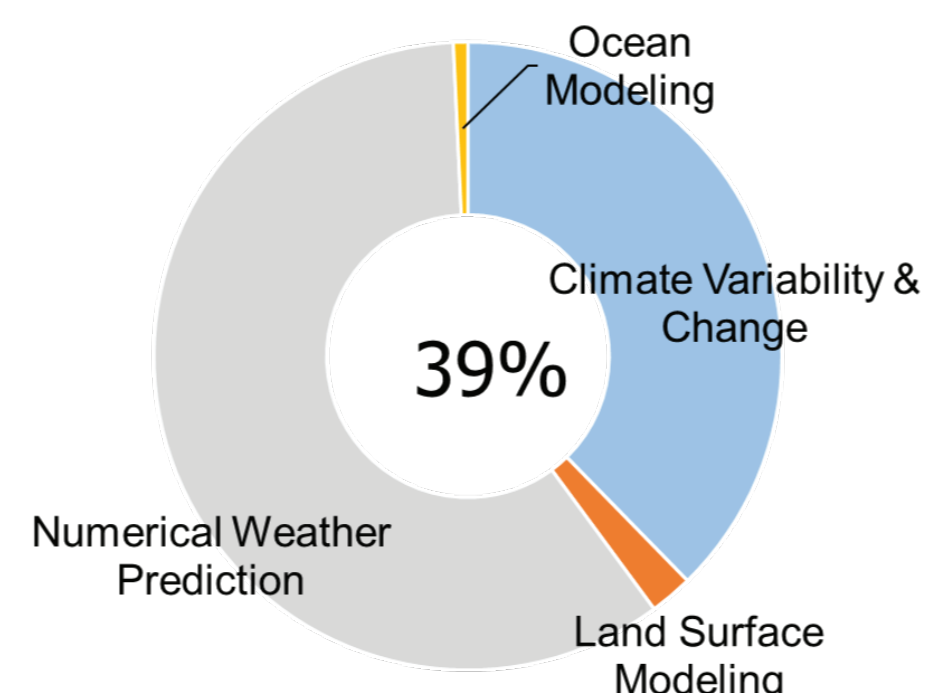


Weather, Climate, & Land Surface Modeling

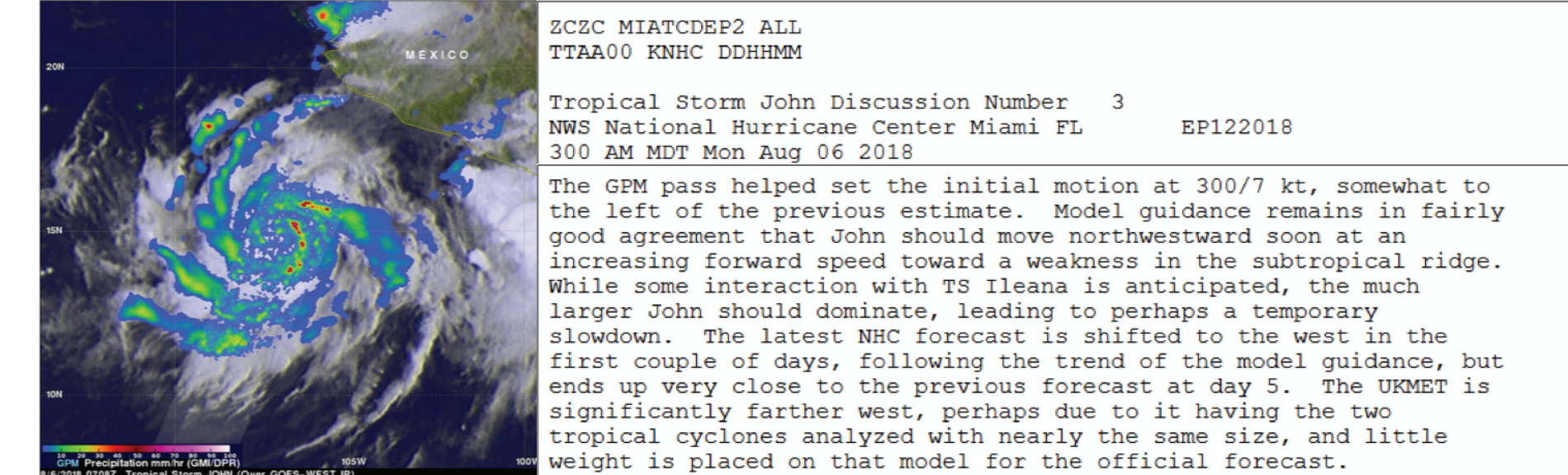
GPM data are integrated into NWP, climate, and land surface models to improve the observations from which the forecasts are then generated.

Example Users:

- NOAA NCEP
- UK Met Office
- ECMWF
- NASA SPoRT



Case Study: Hurricane John



The GPM Core captured the location, intensity, and storm structure of John in the E. Pacific. This data was then used by NHC to help forecast the storms movement.

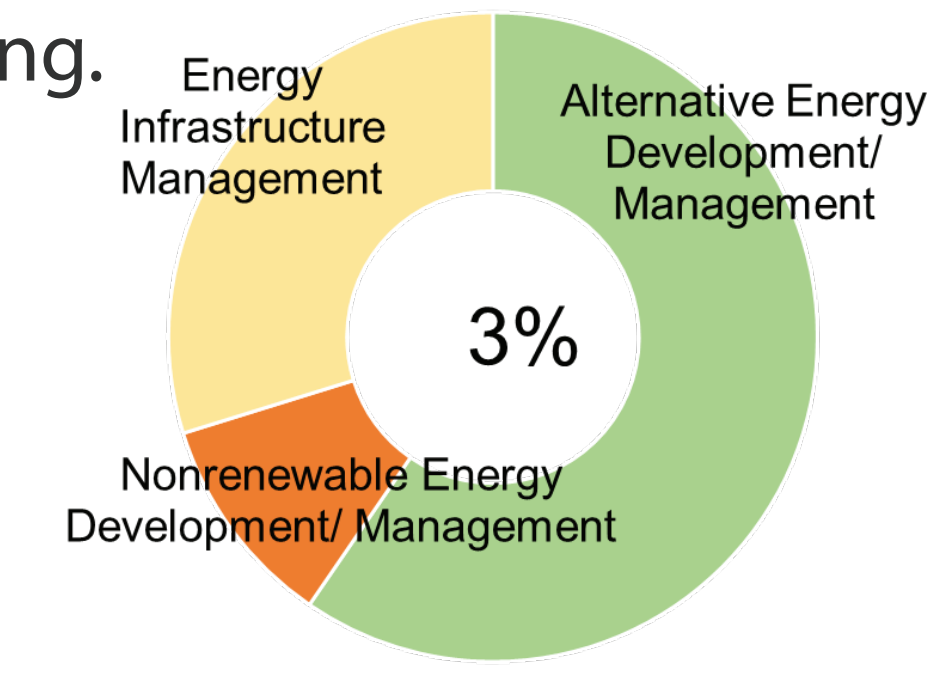


Energy Infrastructure & Management

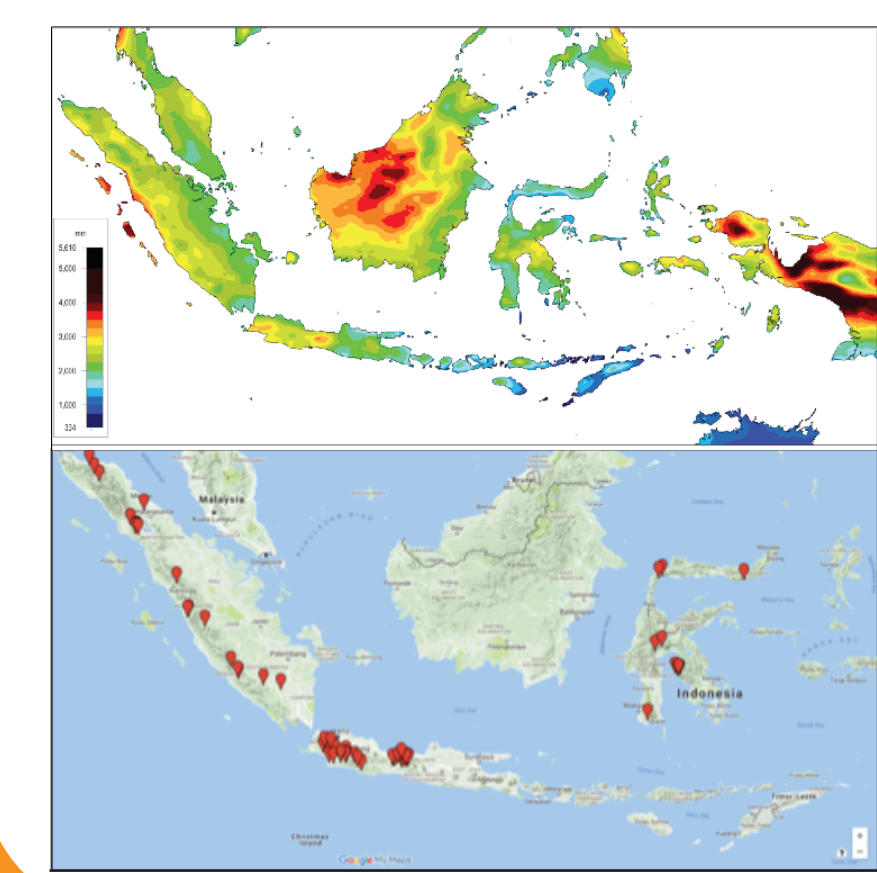
Using GPM data for analyses of climatology data in the prediction of energy demand, development, harvesting, and production of non/renewable energy resources, and load forecasting.

Example Users:

- Clean Power Research
- Deltares
- Manitoba Hydro
- Itaipu Binacional



Case Study: Hydropower in Indonesia



INDONESIA HYDRO™ CONSULT is using TRMM and GPM precipitation data to better understand the potential for hydropower projects throughout Indonesia.

Top: Average annual rainfall in Indonesia, 2014 - 2017, shown with IMERG.

Bottom: Current hydropower projects.

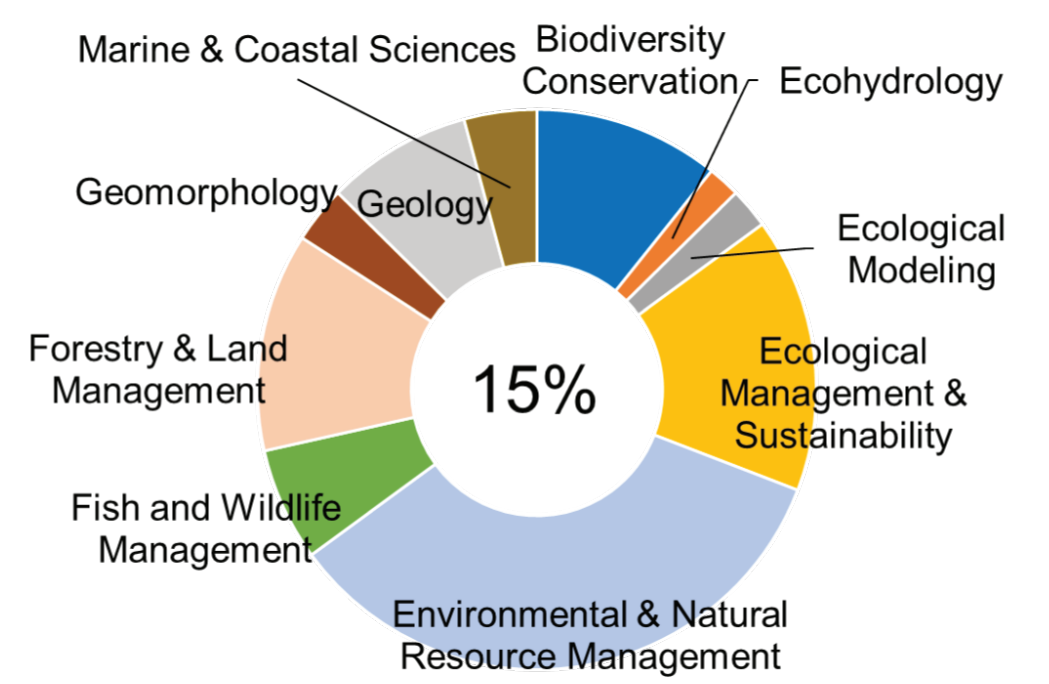


Ecological Management

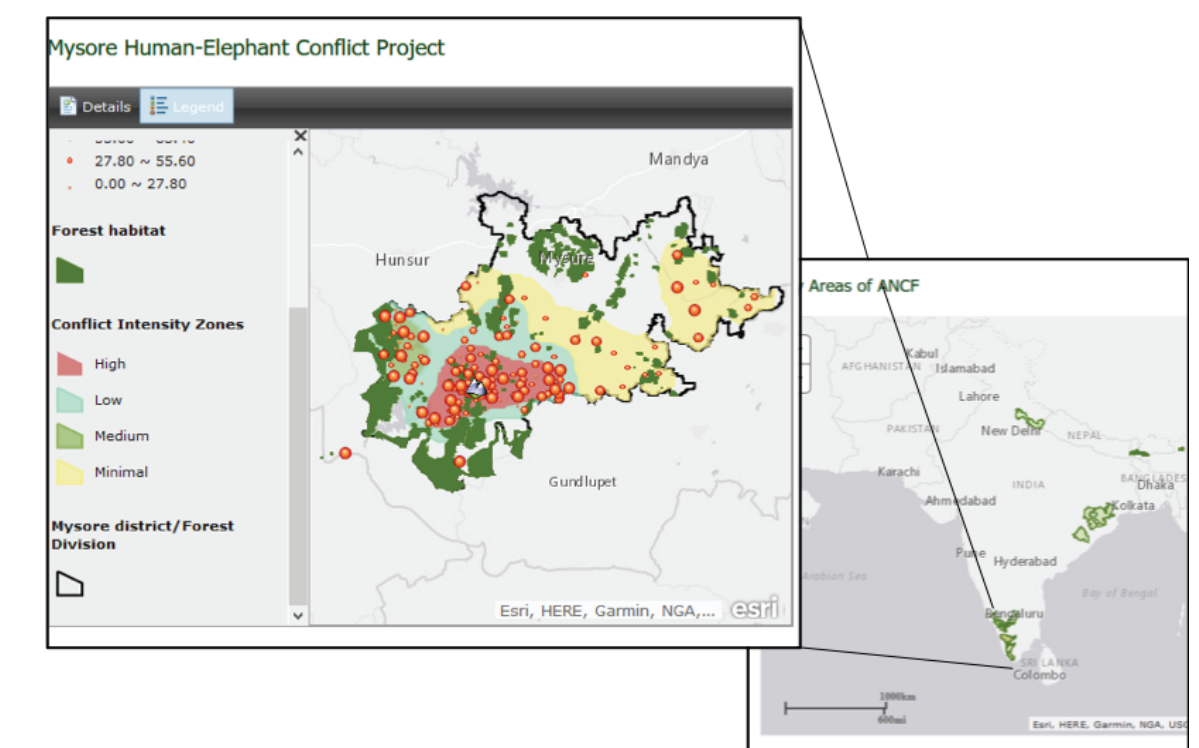
Analyze and forecast changes in precipitation patterns that affect ecosystems and to develop effective resource management strategies.

Example Users:

- MoveBank
- Wildlife Conservation Society
- Elephants Without Borders



Case Study: Human-Elephant Conflict



Map of the location of the Maysore Human Elephant Project (ANCF).

Asian Nature Conservation Foundation (ANCF) and Indian Institute of Science are using TRMM and GPM to determine potential relationships between precipitation, change in forestry, and human-elephant conflict.

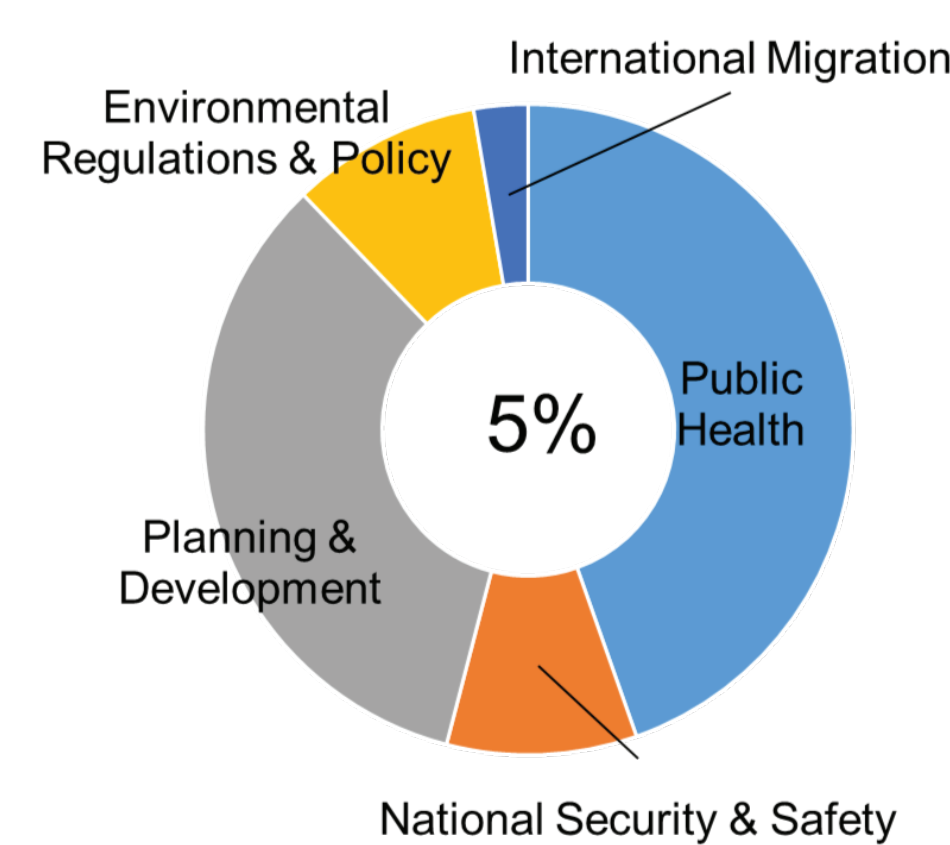


Development & Public Health

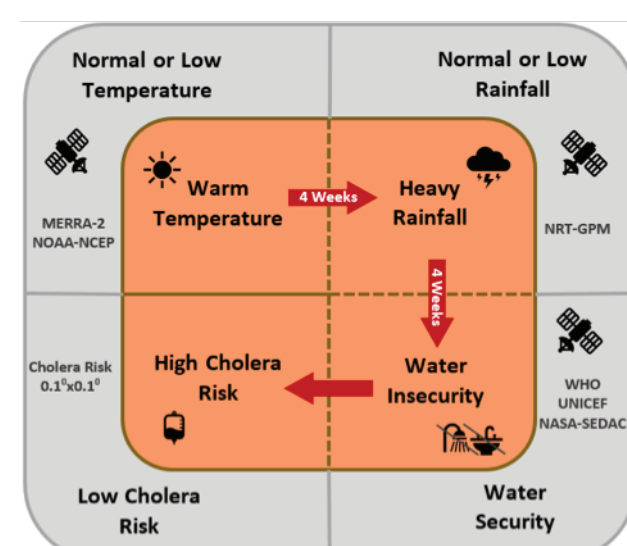
Tracking precipitation anomalies for vector or waterborne diseases and understanding impacts of precipitation extremes that may threaten a country's development.

Example Users:

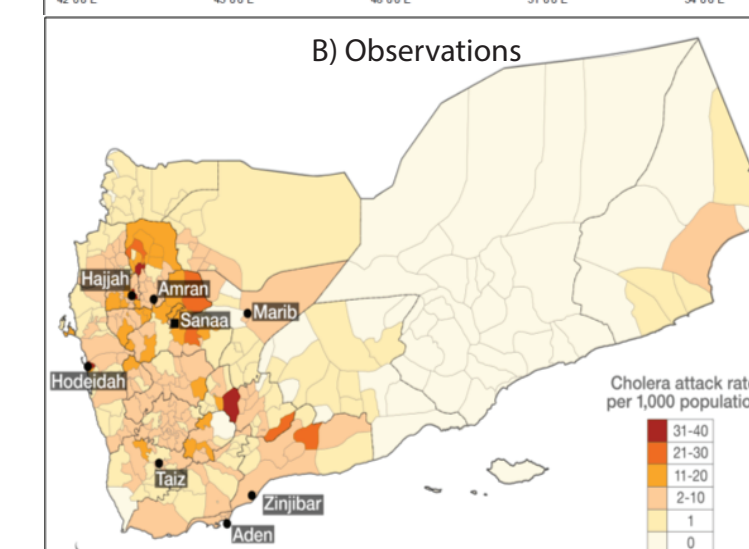
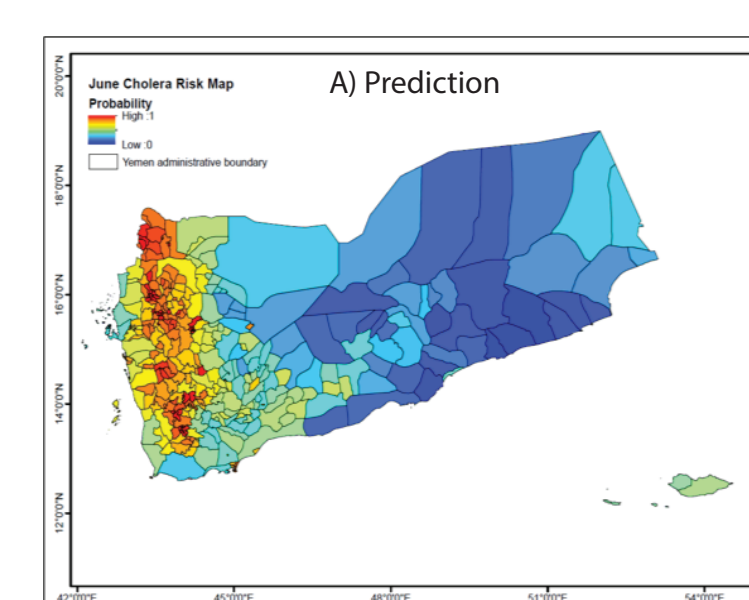
- Academic researchers
- CDC State Department
- Institute for Disease Modeling
- Public Health Agency of Canada
- Red Cross
- BlueDot



Case Study: Predicting Cholera in Yemen

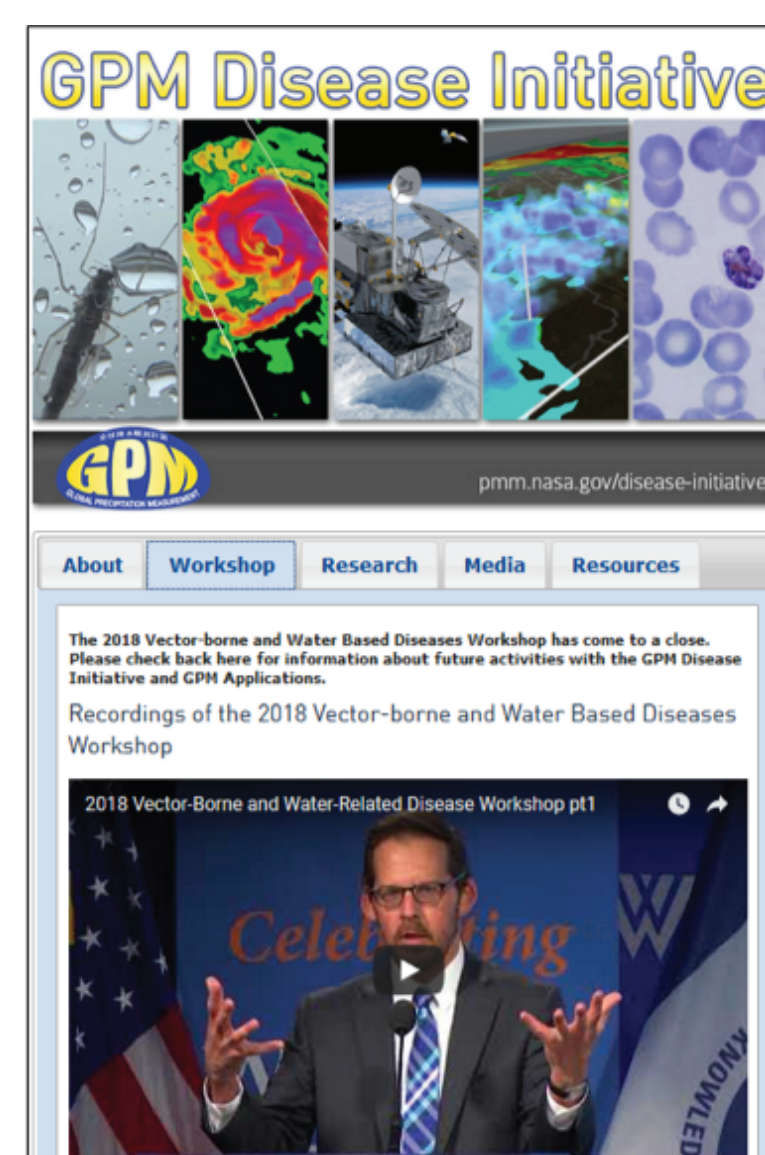


Scientists are monitoring regional hydroclimatic processes and changes in the aquatic ecosystem with NASA satellite data, including TRMM and GPM, to develop forecasts for the risk of a cholera outbreaks.



Flow chart to determine areas at high cholera risk using satellite data (above left). A. Real-time cholera risk prediction map for Yemen in June 2017. Areas in red have the highest risk of cholera outbreak. B. In-country records that a cholera epidemic occurred in June 2017. Credits: Antar Jutta, West Virginia U. (asjutta@mail.wvu.edu) & Rita Colwell, U of Maryland.

Disease Initiative & Workshop



Workshop initiated by NASA and Wilson Center (May 2018) to showcase how NASA data was being used to inform, predict, and better understand water-related and vector-borne disease. Over 97 attendees were present and included researchers, public health officials, and educators from government agencies, NGOs, and academic institutions.

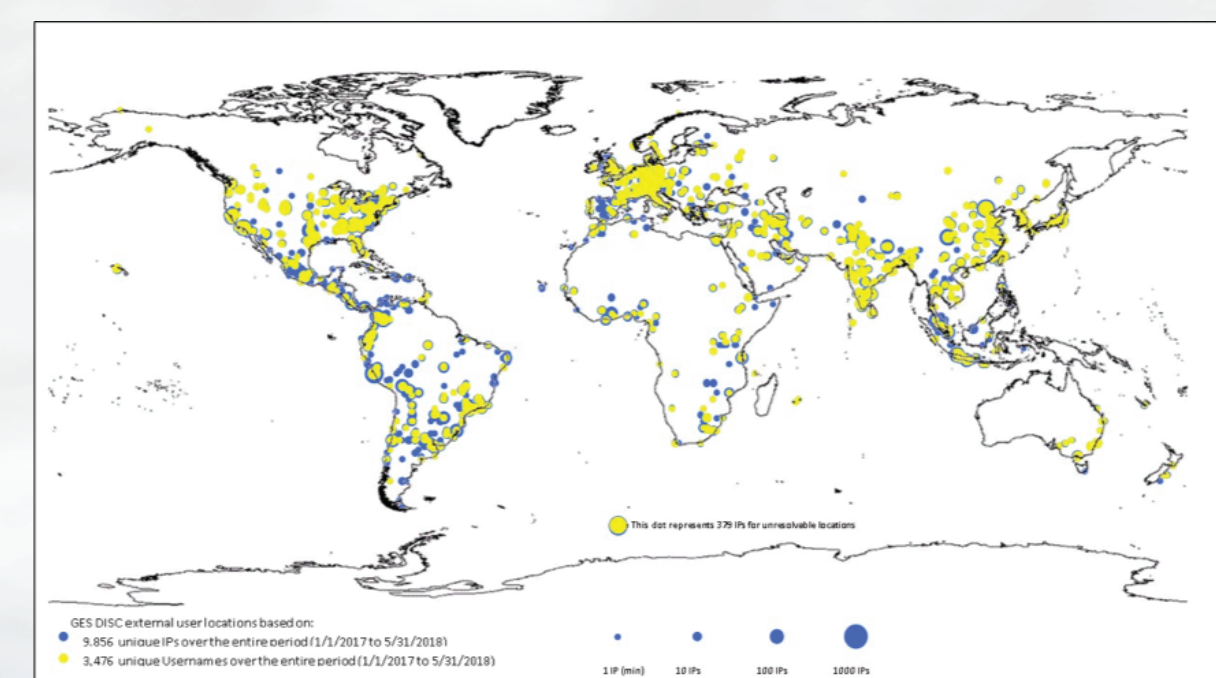
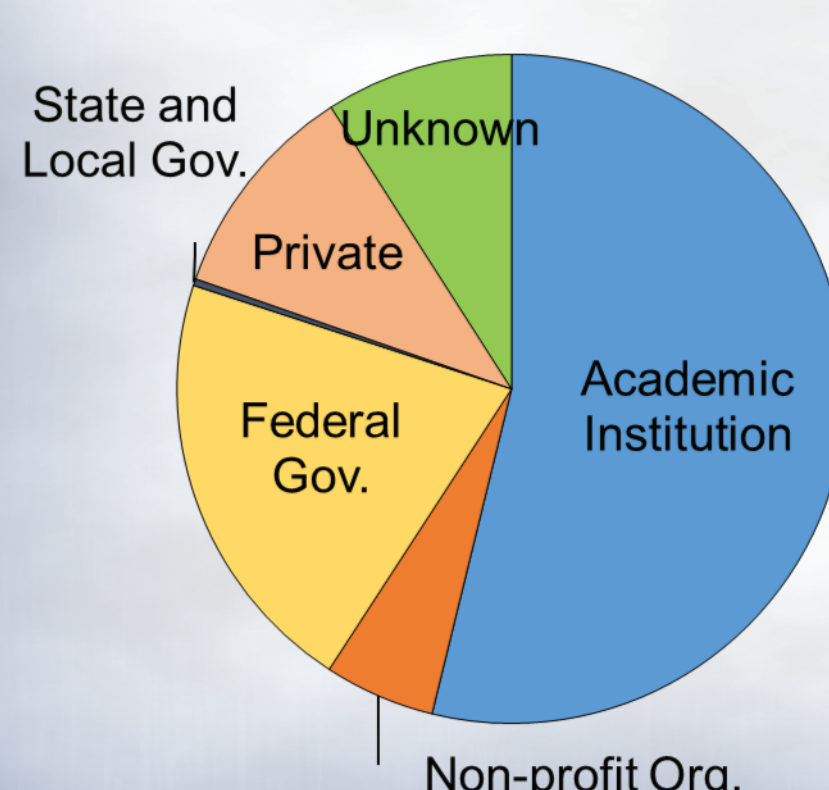
Learn more: gpm.nasa.gov/disease-initiative

APPLICATIONS

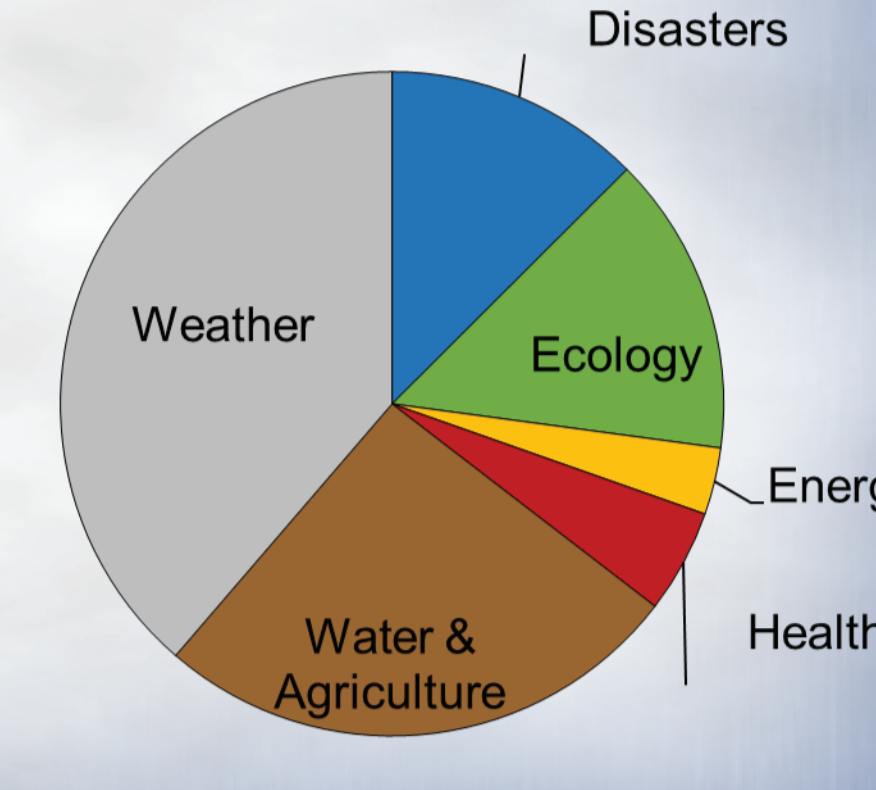
GLOBAL PRECIPITATION MEASUREMENT

gpm.nasa.gov/applications

The GPM Applications Team is designed to understand and quantify how GPM data products are applied within different communities of end users for decision-making as well as promote and educate potential users about how GPM data can benefit their work and lives. On-going objectives include engaging user communities, increasing awareness of GPM data products, and improving data access and visualization of core GPM products for rapid ingestion and analysis. For the applied science community, focusing on both broad areas and targeted thematically-focused communities, trainings, workshops and case studies are utilized to improve awareness and use of data as well as gain feedback in how GPM data products are used for decision making. By focusing on these objectives, the Applications Team are able to learn and address the needs of end users and their application areas, and even more so, expand the GPM portfolio of users over time.



Accessing GPM data products by unique IP address.

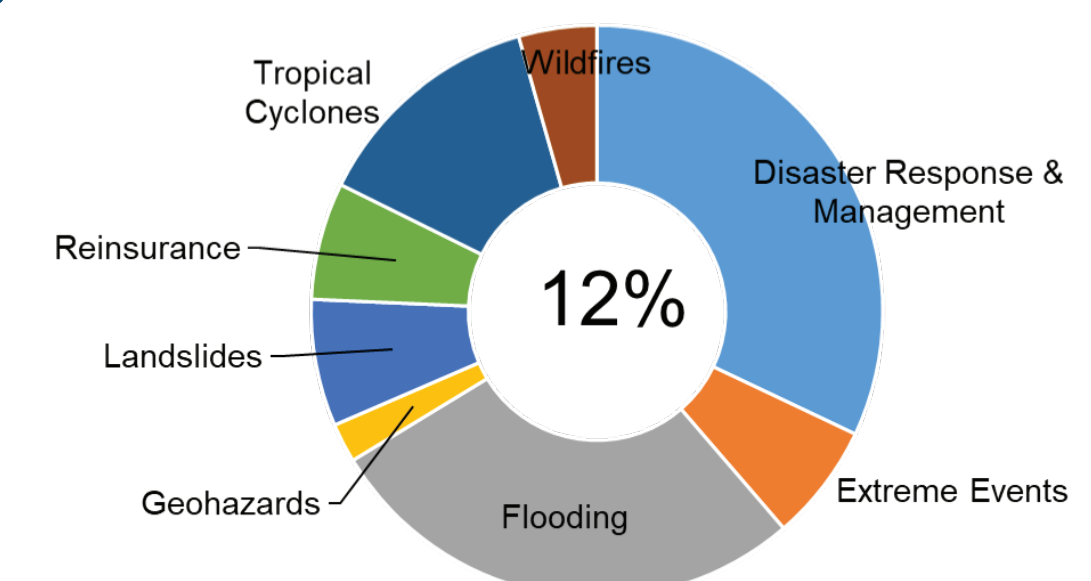


Disasters & Risk Management

GPM serves as an essential tool to improve forecasting, preparation, response, recovery, mitigation and insurance of natural hazards including tropical cyclones, floods, droughts, wildfires, landslides, and other extreme weather events.

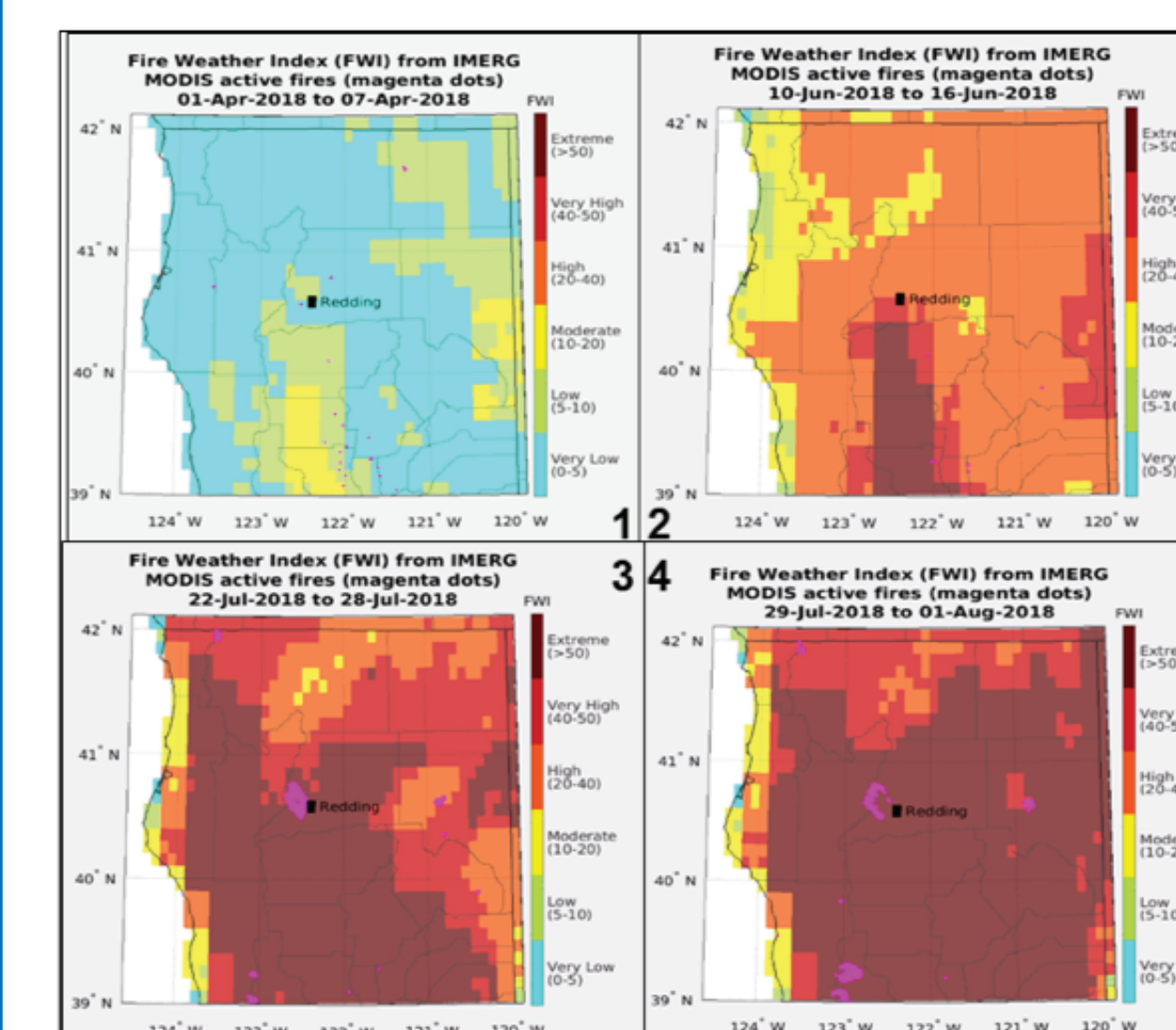
Example Users:

- NOAA NHC
- JTWC
- Red Cross
- Munich Re
- FEMA
- World Bank

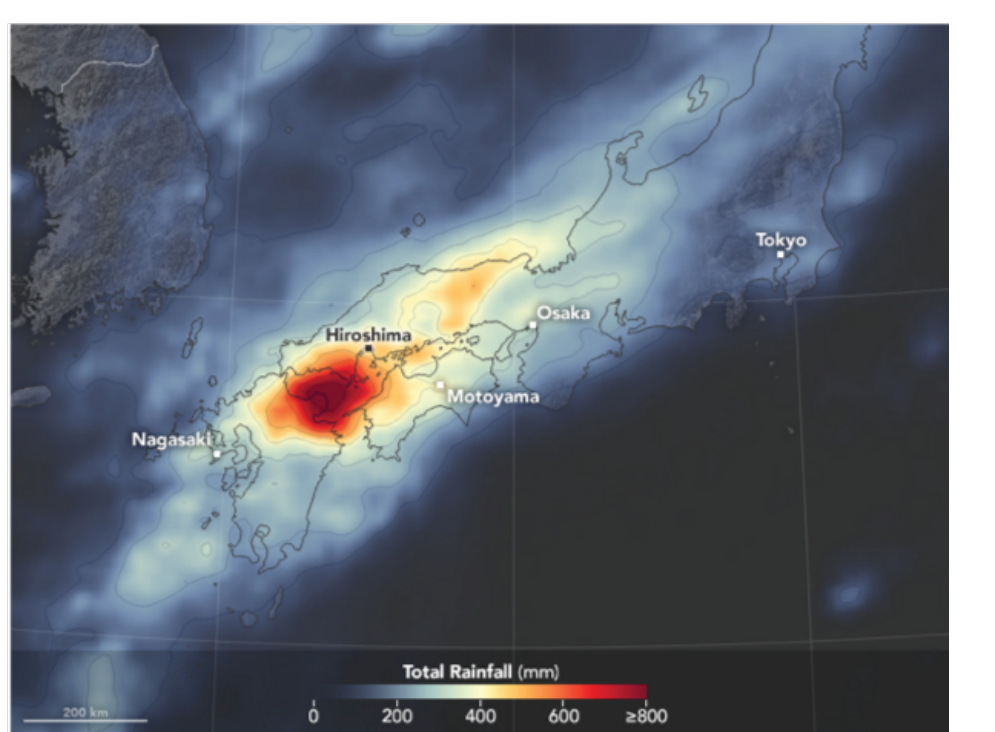


Case Study: Using GPM in Near Real-time (NRT)

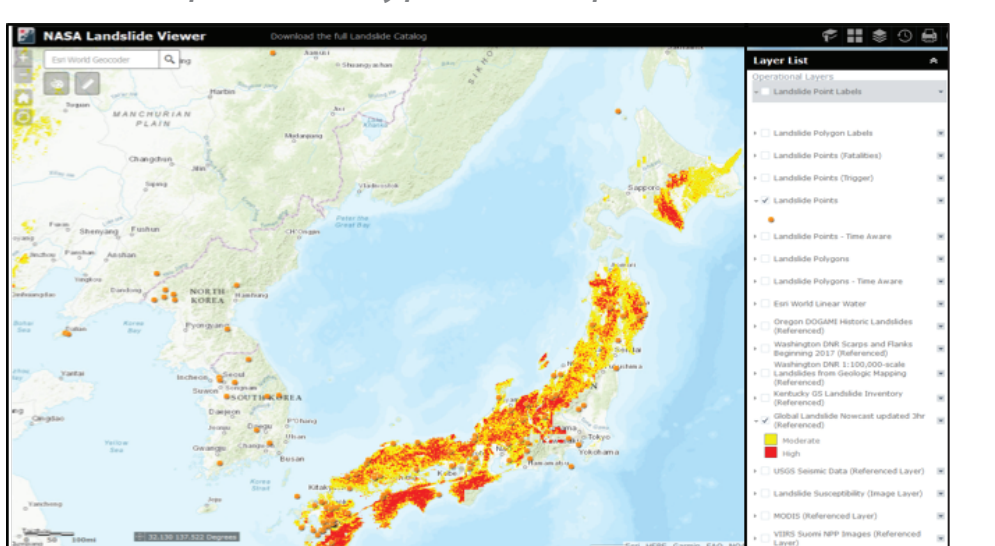
NASA's Global Fire WEather Database (GFWED) integrates different weather factors, including TRMM and GPM data, to help track likelihood of a vegetation fire starting and spreading.



Evolution of weekly FWI and MODIS active fires over northern California from April 1 to August 1, 2018. Credit: robert.feld@columbia.edu



Total rainfall using IMERG from July 2 to July 9, 2018 in Japan from Typhoon Prapiroon.



NASA Landslide Viewer showing "nowcast" of landslides in Japan on July 10, 2018 following Typhoon Prapiroon. Areas that are highly susceptible to landslides from Prapiroon are seen throughout southern Japan.

GPM precipitation estimates are used as an input to the Landslide Hazard Assessment for Situational Awareness (LHASA) model, which provides situational awareness of landslide hazards in NRT. LHASA nowcasts along with Global Landslide Catalog data, and IMERG data can be viewed by NASA's Landslide Viewer tool.

Learn more: landslides.nasa.gov